

Program Announcement to DOE National Laboratories

Natural Gas Infrastructure Reliability Program Applied Research

1.0 SUMMARY

The US Department of Energy's (DOE) National Energy Technology Laboratory (NETL) is seeking applications for research and development activities from DOE's National Laboratories, beginning in FY 2002, in support of its Natural Gas Infrastructure Reliability Program. Proposals are requested to increase and enhance NETL's Natural Gas Infrastructure Reliability research and development activities. Research topics to be addressed by the proposals include remote leak detection, detection of third party damage, underground facility detection, pipe inspection, repair technologies, and materials.

Approximately \$900,000 of FY-2002 funding is expected to be available to initiate the selected research efforts. Subsequent funding for selected projects will depend upon the availability of future year appropriations, as well as upon satisfactory progress towards project goals and deliverables. Field Work Proposals in response to this program announcement shall be submitted by July 26, 2002.

2.0 SUPPLEMENTARY INFORMATION

Introduction & Background

Maintaining the integrity and reliability of the natural gas distribution and transmission systems across the United States is essential to ensure the availability of clean, affordable energy for our homes, businesses and industries. A number of factors, including an aging natural gas infrastructure, increased energy demand, utility deregulation and restructuring, and intense competition requires additional technology development to ensure the continued high level of integrity and reliability.

Natural gas consumption in the U.S. is projected to reach or exceed 35 trillion cubic feet (TCF) per year by 2020, increasing from 21 TCF per year in 1999, and this increase will require maintaining much of the existing natural gas infrastructure and expanding on it. In addition, potential lower emission targets for greenhouse gases could even increase the demand for natural gas as high as 38 TCF per year.

Maintaining the integrity and efficiency of the gas infrastructure may be the most important challenge to achieving a substantial increase in gas deliverability given the age of the existing pipelines. Technological advances in materials, tools and operations will be needed to maintain the throughput of the current infrastructure and expansion for future system demands.

In fiscal year 2001, DOE's National Energy Technology Laboratory (NETL), through the Strategic Center for Natural Gas (SCNG), initiated a new program involving infrastructure

reliability. The purpose of the program is to provide research and technology development to maintain and enhance current reliability of the Nation's gas transmission and distribution network. To achieve this goal, NETL and DOE initiated, and recently updated, a vision and roadmap process to elicit stakeholder and gas industry perspectives on the natural gas infrastructure and the operational needs to maintain or enhance the integrity and reliability of the existing natural gas infrastructure.

The initial visioning workshop was held in Pittsburgh, Pennsylvania on May 3, 2000, and brought together 14 executives from the natural gas industry to discuss market, business and technical issues related to infrastructure integrity and reliability and define strategic goals for addressing them. The results of the visioning workshop were provided to the participants of the first roadmapping workshop which was held in St. Louis, Missouri on June 6 - 7, 2000. Approximately 45 technical experts from industry, universities, national laboratories and government agencies provided input to further define key barriers, R&D opportunities to overcome these barriers and opportunities for collaboration in the area of natural gas infrastructure integrity and reliability research. A second roadmapping workshop was held in Pittsburgh, Pennsylvania on January 29-30, 2002. Approximately 40 technical experts from industry, universities, national laboratories, and government agencies provided additional input to further define key barriers and R&D opportunities to overcome these barriers, opportunities for new research, conduct a gap analysis of the current project portfolio, and identify R&D opportunities in the area of energy security and energy assurance. The information resulting from these workshops is being used to guide and update the existing technology roadmap that will serve as the framework for industry and government in implementing collaborative R&D activities.

The input from these workshops has been summarized in the following reports and are publicly available on the NETL Website.

Pathways for Enhanced Integrity, Reliability and Deliverability at
<http://www.netl.doe.gov/scng/publications/naturalg.pdf>

Roadmap Update for Natural Gas Infrastructure Reliability at:
[http://www.netl.doe.gov/scng/publications/t&d/Pittsburgh Roadmap Update 3-15-02 Final 1.PDF](http://www.netl.doe.gov/scng/publications/t&d/Pittsburgh%20Roadmap%20Update%203-15-02%20Final%201.PDF).

Applicants are encouraged to review the information contained in these documents; however, this is not required to prepare and submit applications under this solicitation.

These roadmap results have been used to select and fund 30 R&D projects including 10 National Laboratory projects. Descriptions of these ongoing projects are available under transmission and distribution at <http://www.netl.doe.gov/scng/index.html>.

Goals and Objectives

Recognizing the scope of expertise and capabilities of the DOE National Laboratories, a primary purpose of this Program Announcement is to seek projects that increase and enhance NETL's

natural gas infrastructure reliability research and development activities. The goal is to develop beneficial advanced technologies for the gas industry to maintain and enhance the integrity and reliability of the Nation's natural gas transmission and distribution network. It is intended that as the Natural Gas Infrastructure Reliability Program grows, the National Laboratory component of the program will also increase and will be focused on topics and priorities to be defined in future Program Announcements.

NETL has announced a Program Solicitation, "Development of Technologies and Capabilities for Natural Gas Infrastructure Reliability" No. DE-PS26-00NT41446, that seeks proposals from private industry, academia, small and large businesses, and research institutes in the research areas described herein. It is expected that the research activities selected from the Program Solicitation and this Program Announcement will significantly accelerate the development and commercialization of a broad portfolio of new technologies to maintain and improve the reliability of the Nation's natural gas infrastructure.

Technical Areas of Interest

Proposers may submit research proposals for any topic area, for more than one topic area, and for research activities that encompass more than one topic area.

Note: Infrastructure directly related to natural gas **storage** is **not** included under this solicitation.

Proposals are requested for research and development efforts that will result in the development of:

- technologies to detect or alleviate third party damage. This includes, but is not limited to, the development of sensors, pipeline materials, coatings, communication, and remote sensing and surveillance techniques to detect infringements, and ultimately potential infringements, on the natural gas transmission and distribution pipelines;
- technologies which allow location, detection, and imaging of subsurface facilities including, but not limited to, non-metallic pipes;
- advanced technologies for the remote detection of pipeline leaks;
- improved technologies for both internal and external inspection of pipes. This includes the development of new and improved sensors, monitors and metering devices which are capable of inspecting piggable and non-piggable pipes;
- improved technologies to repair damaged pipe while minimizing excavation; and,
- materials with increased corrosion resistance and the ability to operate at higher pressures. This includes the development of new pipe material and liners for existing pipes as well as technologies to prevent corrosion on existing pipes. Research to develop materials for "smart pipes" which may be self healing or self monitoring, for example, is also desirable.

The primary objective of the Natural Gas Infrastructure Reliability Program is to fund applied research and development efforts resulting in the development of technology that will maintain

and enhance the integrity, operational reliability, and security of the Nation's natural gas transmission and distribution network. Submission of innovative, higher risk R&D proposals is encouraged. It is the intent of DOE, the Strategic Center for Natural Gas and the Natural Gas Infrastructure Program to support and maintain a project portfolio that spans all stages of technology development.

DOE anticipates that technologies or methodologies which are successfully developed under this solicitation will be commercialized for use by, or incorporated into, the natural gas transmission and distribution infrastructure. Therefore, teaming arrangements with technology manufacturers or pipeline operators is encouraged.

3.0 PERIOD OF PERFORMANCE

The period of performance for this lab call can range up to a maximum of fifteen (15) months (October 2002 to January 2004). Project continuation will be based on a comprehensive review of a new Field Work Proposal and shall be subject to (1) funds availability; (2) sufficient progress in the research effort; (3) sufficient progress towards completing the objectives in accordance with a mutually agreed upon management plan; and (4) submission of timely and informative reports.

4.0 DELIVERABLES

Successful applicants selected will be required to submit digital quarterly Technical Reports and a comprehensive Final Report, and digital data to support the research results. A detailed project plan must be submitted within 30 days of award, if the plan in the original proposal is determined to be inadequate. In addition, all selected applicants will be required to submit, within 30 days of award, a public five page (maximum) summary of the current state-of-the-art of the technology being investigated. The summaries will be posted on the NETL/SCNG – Natural Gas Infrastructure Reliability web page for public viewing.

Where appropriate, functioning prototypes shall be delivered to NETL to allow further testing, evaluation, and demonstration with industry.

All reports and deliverables must be clearly identified in the Field Work Proposal.

5.0 FIELD WORK PROPOSAL EVALUATION AND SELECTION

Guidance: Proposals are to be submitted using a standard DOE Field Work Proposal format. Field Work Proposals are to be concise, but informative. An 8-page limit on background and technical information is suggested.

Evaluation Criteria: The following three (3) criteria will be used in the technical evaluation of the field work Proposals.

Criterion 1: Research Concept and Plan (65%)

The evaluation will judge innovation as well as the potential for clear contributions to the issues addressed in the workshop report. Applications shall be evaluated considering: a) the responsiveness of the proposal to research priorities identified in the "Pathways for Enhanced integrity, Reliability and Deliverability"; b) the proposer's understanding of historical accomplishments, advanced developments, and industry needs in the area of the proposed research; c) the adequacy of the statement of objectives (including a review of work completed to date); d) the technical feasibility of the proposed research; and e) the appropriateness of the schedule (principal milestones, decision points, and time for each task). The plan should identify all tasks and clearly describe all deliverables (reports, prototypes, etc.) and the anticipated delivery dates. Basic cost information should be provided for labor, equipment, supplies and materials. A graphic time schedule, which indicates milestones, decision points, deliverables, etc., should be included in the proposal.

Criterion 2: Applicant/Team Capabilities and Facilities (25%)

Capabilities and facilities shall be evaluated considering:

- a) Qualifications and experience of all technical and management personnel participating in the research effort. Past experience of the personnel working with projects of similar size and complexity.
- b) The availability of equipment, laboratory and demonstration facilities (including field test sites/facilities), analytic support and other necessary resources for performing the work relative to the project goals.
- c) Appropriateness of the planned level of effort and labor distribution to complete the research tasks. Proposals should identify all personnel, their responsibilities, level of effort and the tasks that they will perform.

Criterion 3: Industrial Involvement (10%)

Industrial participation is not required, but will be a factor in the evaluation. Industrial involvement shall be evaluated considering: a) the level of participation, the number of industry partners, and the level of participant data or cost-sharing; and b) identification of, and commitment to, a viable plan to transfer the technology to industry at the earliest practicable time.

6.0 PROGRAMMATIC CONSIDERATIONS

In conjunction with the evaluation results and rankings of individual applications, NETL shall make selections for negotiations and planned awards from among the highest ranking applications, using the following programmatic considerations.

- (1) The desire to select Field Work Proposals addressing the research priorities identified in

Section 2.0.

- (2) The desire to select Field Work Proposals that offer potential for clear contributions to the issues addressed in the workshop report.
- (3) The desire to select Field Work Proposals that offer integrated industry research activities.
- (4) The desire to select Field Work Proposals that offer particularly innovative, yet technically feasible goals.

7.0 CONTACTS/ADDITIONAL INFORMATION

Questions or additional information regarding this Laboratory Call can be directed to:

Dr. Rodney Anderson or
Product Manager
US Department of Energy
National Energy Technology Center
P.O. Box 880
Morgantown, WV 26507-0880
Phone: 304-285-4709
Fax: 304-285-4403
Email: rodney.anderson@netl.doe.gov

Dr. Daniel Driscoll
Project Manager
US Department of Energy
National Energy Technology Center
P.O. Box 880
Morgantown, WV 26507-0880
Phone: 304-285-4717
Fax: 304-285-4403
Email: daniel.driscoll@netl.doe.gov

8.0 SUBMISSION OF APPLICATIONS

One signed original and three (3) copies of each Field Work Proposal shall be submitted by 3:00 P.M. EST on July 26, 2002. Copies may be submitted electronically.

Field Work Proposals shall be submitted to:

US Department of Energy
National Energy Technology Center
3610 Collins Ferry Road
P.O. Box 880
Morgantown, WV 26507-0880
Attention: Rodney Anderson
Telephone: (304) 285-4709
E-mail: rodney.anderson@netl.doe.gov